

REMARKS

In the Office Action, claims 1-28 were rejected. By the present Response, claims 9 and 23 are amended. Upon entry of the amendments, claims 1-28 will remain pending in the present patent application. Reconsideration and allowance of all pending claims are requested.

Rejections Under 35 U.S.C. § 102

The Office Action summarizes claims 1-3, 8-10, 15-17 and 22-24 as rejected under 35 U.S.C. §102(b) as being anticipated by Nickles et al. (WO 99/14093; hereinafter "Nickles"). Rejected claims 1, 9, 15 and 23 are independent and will be discussed in detail below.

By the present response independent claims 9 and 23 are amended. Independent claims 1, 9, 15 and 23 and the claims depending there from are believed to be patentable for the reasons summarized below.

Claims 1 and 15

Claim 1 recites an apparatus for controlling a railway consist. The apparatus includes a consist model adapted for computing an objective function from a set of candidate driving plans and a set of model parameters. The apparatus also includes a parameter identifier adapted for calculating the model parameters from a set of consist measurements and a trajectory optimizer adapted for generating the candidate driving plans and for selecting an optimal driving plan to optimize the objective function subject to a set of terminal constraints and operating constraints.

Claim 15 recites a method for controlling a railway consist. The method includes computing an objective function from a set of candidate driving plans and a set of model parameters and calculating the model parameters from a set of consist measurements. The method also includes generating the candidate driving plans and

selecting an optimal driving plan to optimize the objective function subject to a set of terminal constraints and operating constraints.

Applicants submit that the invention permits the computation of an objective function from a set of driving plans and from a set of model parameters as recited in the specification by a consist model. *See* Application, paragraph 13. Further, the trajectory optimizer generates candidate driving plans and selects an optimal driving plan to optimize the objective function.

The Examiner argued that Nickles discloses an apparatus for controlling a railway consist, where the apparatus comprises a consist model adapted for computing an objective function from a set of candidate driving plans and a set of model parameters. Further, the Examiner argued that Nickles teaches a trajectory optimizer adapted for generating the candidate driving plans and for selecting an optimal driving plan to optimize the objective function subject to a set of terminal constraints and operating constraints. The Examiner cited figure 2, abstract, col. 20, lines 1-4 and page 3, lines 17-32 of Nickles in support of the rejection.

The cited passages from Nickles do not support the Examiner's position, however. Nickles does not, in these passages or when considered as a whole, fairly suggest computing the objective function from a set of candidate driving plans. As can be seen from the cited passages, Nickles teaches a method of optimizing train operation that includes determining conditions of location, track profile and train forces of the train. The track profile data base, location and consist information are used to draw the track profile in the horizontal view, curvature view and overhead view and provided to leader display. Further, a set of primary restraint operating parameters are determined from the determined conditions and at least one set of preliminary train optimizable operating parameters to minimize train forces, to maximize fuel efficiency and to minimize time to destination is determined. The

determined set of preliminary train operating parameters are weighted and combined and optimized train operating parameters are determined from the weighted and combined preliminary train operating parameters.

However, Nickles *does not suggest the computation of the objective function from candidate driving plans*. Further, Nickles does not teach generation of *candidate driving plans* and selection of an optimal driving plan to optimize the objective function. Rather, Nickles teaches the use of the intra-train forces and other parameters for obtaining a local optimum setting of the parameters. The Nickles approach does not, however, rely upon a look-ahead dynamic optimization framework for generating the *candidate driving plans* and *selecting the optimal candidate driving plan* to optimize the objective function.

Applicants respectfully submit that anticipation of independent claims 1 and 15 and their dependent claims cannot be supported based upon Nickles, and that these claims are allowable. Applicants respectfully request the Examiner to reconsider rejection of the claims.

Claims 9 and 23

Amended claim 9 recites an apparatus for controlling a railway consist. The apparatus included a consist model adapted for *computing an objective function from a set of candidate driving plans* and a set of model parameters and a parameter identifier adapted for calculating the model parameters from a set of consist measurements. The apparatus also includes a trajectory optimizer adapted for generating the candidate driving plans and for selecting an optimal driving plan to optimize the objective function subject to a set of terminal constraints and operating constraints and a display module adapted for displaying a formatted driving plan from the optimal driving plan and the consist measurements. The objective function being a quantity or a combination of quantities

selected from the group consisting of fuel consumption, travel time, integral squared input rate, and summed squared input difference.

Amended claim 23 recites a method for controlling a railway consist. The method includes computing an objective function *from a set of candidate driving plans* and a set of model parameters and calculating the model parameters from a set of consist measurements. The method includes *generating the candidate driving plans and selecting an optimal driving plan* to optimize said objective function subject to a set of terminal constraints and operating constraints and displaying a formatted driving plan from the optimal driving plan and said consist measurements. The objective function being a quantity or a combination of quantities selected from the group consisting of fuel consumption, travel time, integral squared input rate, and summed squared input difference.

Here again, the Examiner argued that Nickles discloses an apparatus for controlling a railway consist comprising a consists model for computing an objective function from a set of candidate driving plans and a set of model parameters. Further, the Examiner argued that Nickles teaches a trajectory optimizer adapted for generating the candidate driving plans and for selecting an optimal driving plan to optimize the objective function subject to a set of terminal constraints and operating constraints and a display module adapted for displaying a formatted driving plan from the optimal driving plan and the consist measurements. The Examiner cited figure 2, page 3, lines 17-32 and page 4, lines 20-22 of Nickles in support of the rejection.

As discussed above with reference to claims 1 and 15, Nickles does not teach or even suggest the computation of the objective function *from candidate driving plans*. Furthermore, Nickles does not teach *generation of the candidate driving plans* and selection of the optimal driving plan to optimize the objective function. As can be seen from the cited passages, the optimized operating parameters may be

displayed and/or the train controlled to the determined optimizing parameters. *See* Nickles, page 4, lines 20-22. However, Nickles does not teach display of a formatted driving plan from the optimal driving plan and the consist measurements.

Absent any teaching regarding these recitations of claims 9 and 23, Nickles simply cannot anticipate claims 9 and 23. Therefore, Applicants submit that independent claims 9 and 23 and their dependent claims are allowable and respectfully request the Examiner to reconsider rejection of the claim.

With regard to dependent claims 2-3, 8, 10, 16-17, 22 and 24 these claims depend directly or indirectly from allowable claims 1, 9, 17 and 23 and are therefore considered to be allowable at least by virtue of their dependency from an allowable base claim.

Rejections Under 35 U.S.C. § 103

Claims 4-5, 11-12, 18, 25-26 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nickles in view of Breed, U.S. Pub. 20030191568. Claims 6-7, 13-14, 19-21, 27-28 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nickles in view of Meyer, U.S. Patent 6,641,090.

With regard to dependent claims 4-5, 6-7, 11-12, 13-14, 18, 19-21, 25-26 and 27-28, these claims depend directly or indirectly from allowable claims 1, 9, 15 and 23 and are therefore considered to be allowable. Applicants respectfully submit that Breed and Meyer do nothing to obviate the deficiencies of Nickles, and that all dependent claims now pending are in condition for allowance.

Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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